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To: Mr. A.M. Wilson
Manager, Hydraulic Generation Performance
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A14 H14

PONTOOK GS PERFORMANCE ACCEPTANCE TESTS

G.L. Grant

Turbine performance acceptance tests were performed on Units 1, 2 and 3 at Pontook GS in New Hampshire USA. This report contains the results of electrical output measurements, corrected for known metering errors.

As requested, Research Division personnel performed electrical measurements in order to calculate the generator electrical output power, generator losses, exciter power and other quantities required for the calculation of turbine output power during the performance acceptance test on Units 1, 2 and 3 at Pontook GS. The tests consisted of one run at each of six power output levels. During each run, the electrical output from the generator was measured while hydraulic measurements were simultaneously taken. The generator excitation was adjusted during the test to maintain operation at unity power factor.

Values of both generator output power in kilowatts and turbine output in horsepower have been tabulated against nominal percent load, and the values are listed in Table I. The turbine output was calculated by adding the known generator losses to the measured generator output in kilowatts, and then multiplying by 1.341 to determine the horsepower. These test results have been corrected for all known instrumentation errors, including the voltage and current transformers.

The errors due to voltage transformers (vt) and current transformers (ct) for Unit 1 were determined by measuring the generator output using a calibrated set of vt and ct, and comparing the results to output measurements taken simultaneously using the generator vt and ct. The difference between these two output measurements was used as a correction to the measurements taken

during the actual acceptance tests. Since the vt and ct for all three units are of the same type, it was assumed that the errors would be similar for all three units, and therefore the same corrections were also applied to test results on Units 2 and 3. However, they are only known to be true for Unit 1.

The instrument calibration report for the watt/watthour transducer used in these tests is appended. The generator electrical output measurements are estimated to be accurate within $\pm$0.15% for Unit 1 and $\pm$0.30% for Units 2 and 3. The higher value for Units 2 and 3 is due to uncertainties in the vt and ct errors for these units.

Approved by:

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Manager
Electrical Research Dept

Submitted by:

G.L. Grant
Technologist
Electronics & Instrumentation Section

Reviewed by:

R.D. Brown
Supervising Engineer
Electronics & Instrumentation Section

GLG:lAg

Percent Load	Measured Generator Output (KW)	Calculated Turbine Output (HP)
	Unit No 1 (February 13-14, 1987)	
50	1851.4	2527
60	2220.1	3030
70	2553.1	3485
80	2927.2	3997
90	3277.8	4478
100	3598.7	4920
	Unit No 1 (January 14, 1987)	
50	1954.5	2667
60	2340.4	3195
70	2694.8	3679
80	3077.9	4204
90	3450.5	4716
100	3778.9	5168
	Unit No 2 (January 15, 1987)	
50	1856.9	2534
60	2232.1	3046
70	2606.8	3557
80	3003.2	4099
90	3398.0	4641
100	3748.3	5123
	Unit No 3 (January 16, 1987)	
50	1884.4	2573
60	2270.8	3101
70	2648.1	3617
80	3037.6	4150
90	3402.4	4651
100	3737.4	5112

Table I

Generator and Turbine Output Data - Pontook GS

Ontario Hydro Research Division

instrument calibration report

to	Mr. M. Sein Electronics & Instrumentation Section Research Division
instrument	Watt/Watthour Transducer
serial no.	Lab No 3788
nameplate data	Scientific Columbus Watt/Watthour Standard Model DL34-2K5-A2-6070 5 A 120 V 60 Hz 1500 W 3 element 3 phase 4 wire 1 mA dc into 0 to 10 k ohm
received from	Electronic & Instrumentation Section
date received	February 16, 1987

Calibration by Standard Watthour Meter (SC1) on Balanced
Three Phase Load 1.0 pf 60 Hz
Ambient Temperature 23 C

Test Current (Amperes)	Test Voltage (Volts)	Percentage Registration
1.5	122.0	99.87
1.9	122.0	99.87
2.1	123.0	99.87
2.5	123.0	99.87
2.7	123.0	99.86
3.0	123.0	99.86

The true integrated time is 0.01% longer than indicated on the panel thumb wheel switches.

The transducer was connected 2 element (red & blue) 3 phase.

The percentage registration was based on the digital readout and the time set by the internal interval timer.

The accuracy of the calibration is estimated to be ±0.1 percentage registration.

Approved:	Certified:	Tested:
R.D. Brown	M. Sein	G.L. Grant
Supervising Engineer	Supervising Technologist	Technologist

standards laboratory · electronics and instrumentation section · electrical research department

next calibration scheduled for:	file	date	report no.
	815.11(P).	February 17, 1987	EC87-63-K

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